Extensor Tendon Injury to the Fingers, Lack of Insight and Poor Assessment Leading to Late Presentations: A Report of 10 Case Series

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Abstract

The subcutaneous position of the extensor tendons makes it possible for the tendon/s to be lacerated in many cases of sharp object cuts on the dorsum of hand. The lack of insight and the poor patients' assessment cause the primary clinician to secure hemostasis and repair the obvious skin wound only. This unrecognized tendon injury would later become obvious because of persistent deformity and loss of function. This is a case series of patients with delayed diagnosis of extensor tendon injuries to the fingers as seen in a level II surgical specialty from January 2006 to December 2016.These extensor tendon injuries presented late after healing of skin wounds. Tenolysis, tenorrhaphy and physiotherapy were successful but the delay caused loss of man hours and added cost to treatment.

Keywords: Extensor tendon, finger injury, late presentation, poor assessment, tenorrhaphy

Introduction

Sharp cuts from falling glass louvers, smashed bottle edges, knife stabbing, machete and rotating fan blades, human bites, and finger jamming are associated with extensor tendon injuries of the hand.[1] The high energy of impact necessarily would lacerate the thin skin as well as the underlying structures, especially the extensor tendons which are anatomically superficial.[2] Neglecting this basic anatomy and the pathomechanics of sharp cuts to the dorsum of the hand often leads to inadequate clinical assessment by the primary clinician. Securing hemostasis and suturing the skin wound apparently allayed the apprehension of the patients and momentarily satisfied the clinician. Re-presentation of patients after wound healing, because of persistent deformity and the inability to extend the finger/s, may raise the red flag with respect to the initial unrecognized tendon/s injury.

Associated fractures in such hand injuries may easily be recognized but should be confirmed by radiographs, especially as it could just be a tiny pulled bone such as in mallet finger.[3] Conversely, the inability to extend the fingers at first presentation could be mistakenly attributed to pain and apprehension. This misdiagnosis is also common when the patients are assessed under general anesthesia, as active finger movements are necessary to clinically diagnose tendon injuries. Also important is the ability of the patient to move the fingers on request while the repair is going on like in the acclaimed awake tendon repair with local anesthetics,[4,5] so as to determine the adequacy of repair and establish early gliding of the tendon. However being conscious of this injury and carrying out a proper clinical assessment would lead to correct diagnosis and correct treatment and thus prevent the problems associated with late repair.

The literatures recognizing this entity are numerous, but none highlights this peculiarity in our environment. This case series outlines the need for accurate clinical assessment at first presentation and emphasizes the importance of primary tendon repair to avoid deformity and hasten return to normal functions.

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Case Presentation

One of the patients was a 42-year-old lady who was stabbed with a broken bottle on her left hand following an altercation with a neighbor. She was rushed to a general practitioner who secured the hemostasis and repaired the skin wound. The wound healed few days later, but in the following ten weeks, she noticed persistent deformity of her index finger and inability to extend it. It was in this condition that she came to us [Figure 1]. Examination confirmed that her index finger was held in a flexed position, the bones and joints were normal, and she could not extend the finger actively. Other fingers were normal and function of the hand was reasonably satisfactory in this right-handed patient. We carried out a tendon repair under general anesthesia and proximal tourniquet with an extended vertical incision along the index finger. The retracted proximal end of tendon was identified, adhesions were released, and the tendon was elongated by Z-plasty, so that it could reach the distal end for repair with polyethylene 2/0 [Figure 2]. A cast was applied with the fingers in extension for 4 weeks to avoid tension on the repair until healed. Active and passive range of motion exercises were commenced with a good result at 8 weeks post operation [Figure 3].

A similar presentation was a 17-year-old undergraduate female student whose dominant right hand accidentally got cut by a rotating ceiling fan blade in her school hostel. A medical officer in the university health center saw her and secured the hemostasis and sutured her wound. At the end of 3 weeks, she noticed persistent deformity and the inability to extend her ring and little fingers. Examination revealed an indurated, healed wound on the dorsum of the hand with the right little and ring fingers held in a flexed position. There was loss of active extension in these two fingers, whereas the other fingers extended normally [Figure 4]. Tenorrhaphy was carried out through a single extended incision on the lateral aspect of the dorsum of the hand. The retracted tendons were pulled down after freeing them from fibrous adhesions, and end-to-end repair with nylon 2/0 was done. The fingers were splinted in extension for 4 weeks, and physiotherapy was commenced thereafter with satisfactory results [Table 1].

Figure 1: Clinical photograph showing deformity and inability to extend the index finger

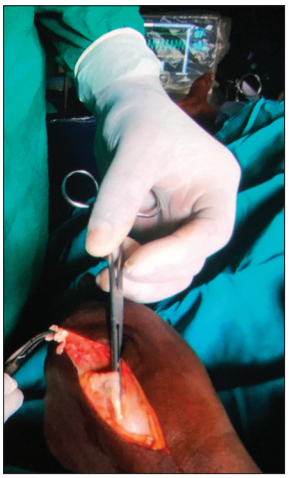

Figure 2: Intra-operative photograph showing tenolysis and repair

Figure 3: Eight weeks post-operation, extension of finger restored

Figure 4: Clinical photo of right hand extensor tendon injury to IV and V fingers showing deformity and inability to extend the two fingers

Discussion

Extensor tendon injury of the hand is common with sharp objects cutting the dorsum of the hand either by accident or by assault.[1] Injuries from falling glass louvers are less common now because buildings nowdays have windows made with aluminum frames and glass and are often fabricated in sliding patterns. On the other hand, assault with machete and broken bottle stabs are still observed as causes of hand injury in the past and recent times, suggesting that violence and lawlessness are still prevalent in our society. Extensor tendon injury is a recognized defensive blockage injury,[1] which the patient sustains while protecting the face or head from the injury as the assailant strikes with the sharp object. This type of injury is more likely to affect the dominant hand as seen in this case series unlike the falling glass louver that could affect either of the hands or even the flexor tendons at the wrist, depending on the position of the hand at the time of injury. Nevertheless, extensor tendon injuries of the hand are more common than flexor injuries.[6]

If the extensor tendons to the fingers when injured are timely recognized as they should be, primary repair is likely to give a better result than delayed repair in terms of period of rehabilitation,[7] cost of treatment, and the patient's eventual satisfaction. The recognition of extensor tendon injuries at the time of initial assessment is aided by good knowledge of the anatomy and functions of the extensor tendons. Although the extensor tendons to the fingers act independently, the extensor expansion sends fibrous twigs to the different tendons, and therefore, the movement of adjoining fingers in extension is observed as any one finger is being actively moved. It is important to discern this trick movement caused by juncturae tendinum between the communis tendons as the clinician examines the extension of each finger following hand injury.[8] The intrinsic muscles like the lumbricals also extend the fingers, and this fact should be kept in mind during the assessment.[8] The anatomic zones according to Kleinert and Verdan[9] also help the clinician determine the treatment option. It is known that injuries in the odd zones, across the joints, and the more proximal zones VII and VIII have peculiar treatment modalities than repair on the dorsum, zone VI.[3] Most of our patients fell under zone VI, in which the repair is more straightforward. Treatment is also influenced by the cause of injury. Injuries from contaminated objects such as farm machetes or human bites would require debridement, delaying repair for up to seven days.[10] The degree of injury also determines which surgeon does the repair and whether the repair should be in the accident and emergency or operating theater with the full complimentary apparatus, including a good lighting source and a surgical expert.[11,12]

Adequate preoperative assessment of the hand, if possible, should be done so that the plan for primary tendon repair or the option of referral could be undertaken early. Because of pain and apprehension, this initial assessment is better

Table 1 below shows distribution of the patients with late presentation of extensor tendon injuries of the fingers according to age, gender, sidedness, etiology, pattern of presentation and outcome

Age	Sex	Side affected	Hand dominance	Cause	Anatomic zone	Tendon involved	Associated injury	Year of presenting	Duration before presentation (weeks)	Duration before full recovery (weeks)
42	F	L	R	Assault bottle cut	VI	EIP	Nil	2016	10	8
17	F	R	R	Rotating fan blade	VI	EDM, ECU IV finger	Nil	2016	3	5
17	M	L	R	Assault bottle cut	VI	III finger	Nil	2012	7	6
16	F	R	R	Assault machete cut	VI	III finger	#III metacarpal	2012	5	4
30	F	R	R	Assault pulled finger	I	EIP	Mallet finger	2011	3	4
18	M	L	R	Assault bottle cut	V	III finger	Nil	2011	4	3
17	F	R	R	Assault machete cut	VI	III and IV fingers	#IV, V metacarpals	2009	6	4
22	M	R	R	Assault machete cut	VI	EIP, III finger	#III metacarpal	2009	8	7
16	M	L	R	Glass louver	VI	EDM	Nil	2006	4	5
15	F	L	L	Glass louver	VI	EIP, III finger	Nil	2006	6	6

#Fracture, EIP=Extensor indicis proprius, EDM=Extensor digiti minimi, ECU=Extensor carpi ulnaris. The number of patients is small to make any statistical inference on the sex or side of injury. However, majority of the patients are in the second decade of their lives. Right-handed patients were in the majority, and the side affected in relation to defensive blockage of the assailant weapon tallied with the dominant hand. Louvers are no longer used in buildings nowadays, and this may account for the absence of glass louver injuries in the recent cases. On the other hand, violence is an ongoing menace in the society with many of the patients having suffered over the period from machete and broken bottle stabbing injuries. The average duration of full recovery is 5.2 weeks.

done under adequate analgesia, so that the patient will obey the command of actively extending the fingers as a group and then individually. Sensation could also be assessed on a patient who is awake. Cases in which this is not possible, on-table assessment under anesthesia should be carried out with a high index of suspicion of tendon injury. It is better to assume a tendon injury and thoroughly look out for it once there is a skin laceration following a sharp cut to the dorsum of the hand until proven otherwise. If the diagnosis is made and the proximal end is retracted from the wound, a vertical incision could be extended from a horizontal wound to create a hybrid 'L' or 'T' wound. Furthermore, tendon retraction at the time of initial presentation is usually small as compared to when the patient presents late. Retraction after tendon cut is worse with flexor tendons, and this could mean more extensive proximal exploration. The distal end of the torn tendon on the other hand is often located very close to the wound irrespective of the time of presentation.[13] The extensor tendon repairs need tact to avoid adhesions and scarring especially as they are thinner, flatter, and lack tendon sheaths and also lie very close to the bones and joint in comparison with the flexor tendons.[14] These adhesions with associated stiffness impair function and dynamic splint is needed, when possible, to enhance early movement.[15] We used static plaster of Paris splints in extension to avoid undue tension on the repairs for at least four weeks before physiotherapy.

There is a cursory proportionate relationship between the time of initial injury to the time of delayed repair and the duration it takes for full recovery after physiotherapy [Table 1]. Other factors like patient's motivation play a major role with compliance to physiotherapy and thus eventual recovery, but putting this factor aside, it is clear from this case series that the shorter the duration of presentation and repair, the shorter the period of rehabilitation before full recovery. This could be extrapolated to mean a quicker return to activities of daily living and less cost of treatment. However, a significant statistical inference cannot be made because of the small number of patients.

Conclusion

Inadequate assessment of injuries on the extensor surface of the hand often leads to unrecognized extensor tendon laceration, which would present later as deformity and loss of function. The tip-and-trick is to assume extensor tendon injuries once there is a skin laceration following a sharp object cut to the dorsum of the hand until proven otherwise. This high concern would increase the early diagnostic yield and thus, forestall the problems associated with delayed diagnosis and repair.

Consent

The ethical committee of First Choice Specialist Hospital approved this study.

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The first author conceptualized the study and self-sponsored it while the second author collected and collated the data.

Conflicts of interest

There are no conflicts of interest.

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